

New genus and species records of Bromeliaceae in the Caatinga of Rio Grande do Norte state, northeastern Brazil: *Orthophytum disjunctum* L.B. Sm. (Bromelioideae) and *Tillandsia paraibensis* R.A. Pontes (Tillandsioideae)

Leonardo M. Versieux*, Eduardo Calisto Tomaz and Jomar G. Jardim

1 Universidade Federal do Rio Grande do Norte, Centro de Biociências, Departamento de Botânica, Ecologia e Zoologia, Campus Universitário, Lagoa Nova. CEP 59072-970. Natal, RN, Brazil.

* Corresponding author. E-mail: iversieux@yahoo.com.br

ABSTRACT: In the present work we describe the first occurrence of the genus *Orthophytum* (Bromeliaceae, Bromelioideae) and of the species *Tillandsia paraibensis* within the state of Rio Grande do Norte, northeastern Brazil. Both taxa were recorded on inselbergs in areas of caatinga. These findings are important, improving the knowledge of the Flora of Rio Grande do Norte and giving a better understand of the biogeography of Brazilian bromeliads.

The largest portion of the northeastern Brazil is covered by the *caatinga* vegetation (Albuquerque *et al.* 2012). This tropical dry forest covers eight states and areas with semiarid climate characterized as a result of low rates of precipitation, which is concentrated over a short annual period (Leal *et al.* 2003). The *caatinga* is the only phytogeographic domain that is confined to the Brazilian territory. It harbours great biodiversity, with many still understudied. The lack of scientific research marks the history of *caatinga* areas; nevertheless, this scenario has been changing in the past few decades with an increase in the number of related studies (Albuquerque *et al.* 2012).

The flora of Rio Grande do Norte (RN) is not well represented in its two major local herbaria collections (MOSS and UFRN) due to laxity of complete and representative samples. Together they barely exceed 20,000 specimens (Thiers [continuously updated]). Within this state the lack of investment in long and intensive research programs focused on biodiversity inventories

and the limited number of graduate programs devoted to develop locally trained botanists are two of the main causes limiting further development. As consequence of this low sampling and lack of investigations rather than actual species poverty, RN finds itself listed as one of the poorest Brazilian states in terms of plant species richness, recording only 1,259 species (Forzza *et al.* 2010).

As part of an ongoing project to increase the knowledge of the Flora of Rio Grande do Norte, we herein describe two new occurrences of Bromeliaceae taxa for that state. Until now, no record of *Orthophytum* was known to RN. Recently, *Orthophytum disjunctum* L.B. Sm. specimens were found, in small populations, growing on an *inselberg* (locally known as Pedra do Cruzeiro, 6°25'29.3"S, 35°41'57.9W, 450 m.a.s.l.) in the domain of *caatinga*, near the cities of Passa-e-Fica and Serra de São Bento, in the southeastern RN close to the border with Paraíba (Figure 1). This inselberg is within a public area but it is not under legal protection, despite the richness of plant species observed there. In the same habitat we found the second new occurrence, another rupicolous species belonging to *Tillandsia*. Specimens collected (Versieux 542) are deposited in the herbarium UFRN and living specimens are under cultivation in the "Cacti Garden Project Cactinga", at the Instituto de Biociências, UFRN, Natal, Brazil.

The genus *Orthophytum* Beer is endemic to Brazil and contains 65 known species that occur between southeastern and northeastern Brazil. Currently, there are records for the states of Ceará, Paraíba, Pernambuco, Alagoas, Sergipe, Bahia, Minas Gerais, Espírito Santo (Forzza *et al.* 2012). All species are heliophytes and the majority grows in rocky environments, such as outcrops or *inselbergs* (Louzada and Wanderley 2010). The diversity centers of *Orthophytum* are the states of the Bahia and Minas Gerais, and found growing along the Espinhaço mountain range's rocky fields, and on inselbergs from northeastern Minas Gerais to central-north Espírito Santo



FIGURE 1. Map of Rio Grande do Norte, showing the municipality of Serra de São Bento in red next to Paraíba (PB) state border, where the first occurrences of *Orthophytum disjunctum* and *Tillandsia paraibensis* were documented.

States mostly arising in the Atlantic Rainforest domain, contrasting with the drier *caatinga* domain having fewer taxa (Siqueira-Filho and Leme 2006; Versieux and Leme 2007; Louzada and Wanderley 2011).

The second new occurrence belongs to *Tillandsia*, which is the largest genus within Bromeliaceae, with 627 known species (Luther 2010). It occurs throughout the entire American continent and all over the Brazilian territory. It has not been found in Maranhão and Tocantins (Forzza *et al.* 2012), probably due to poor collection history. This enormous geographical distribution is a consequence of the great seed dispersal capacity provided by light plumose appendages and several ecophysiological adaptations (Benzing 2000). *Tillandsia paraibensis* R.A. Pontes is a recently described species that was known to occur only in three inselbergs in the north of Paraíba state: Pedra da Boca, Pedra da Santa and Pedra do Carneiro (Pontes 2012). In our field work we also registered the occurrence of *T. paraibensis* at Pedra do Cruzeiro, RN. Populations were found on vertical rocks (Figure 2E), in the same habitat as observed by Pontes (2012), and

growing close to *Orthophytum disjunctum* mats. Although all individuals were sterile, the vegetative characters fit perfectly within the protologue of this recently described taxon and the proximity to the type locality is another evidence about its identity.

Both these findings are important because they help to increase the knowledge about the species and also contribute to a range of other studies such as conservational programs and studies in biogeographical distribution of *caatinga* plants. To illustrate this, the limit of *Orthophytum* geographical distribution has been cited as the state of Paraíba (Smith and Downs 1979), but most recent data confirms its presence in the State of Ceará (Forzza *et al.* 2012). Our new record provides continuity between these neighboring states. Thus, it is probable that the lack of knowledge about this species is a consequence of the absence of field studies in the state of Rio Grande do Norte, and we believe this clearly shows the importance of an improvement in the floristic studies for this area and highlights the importance of funding for field work in lowly sampled areas in Brazil.

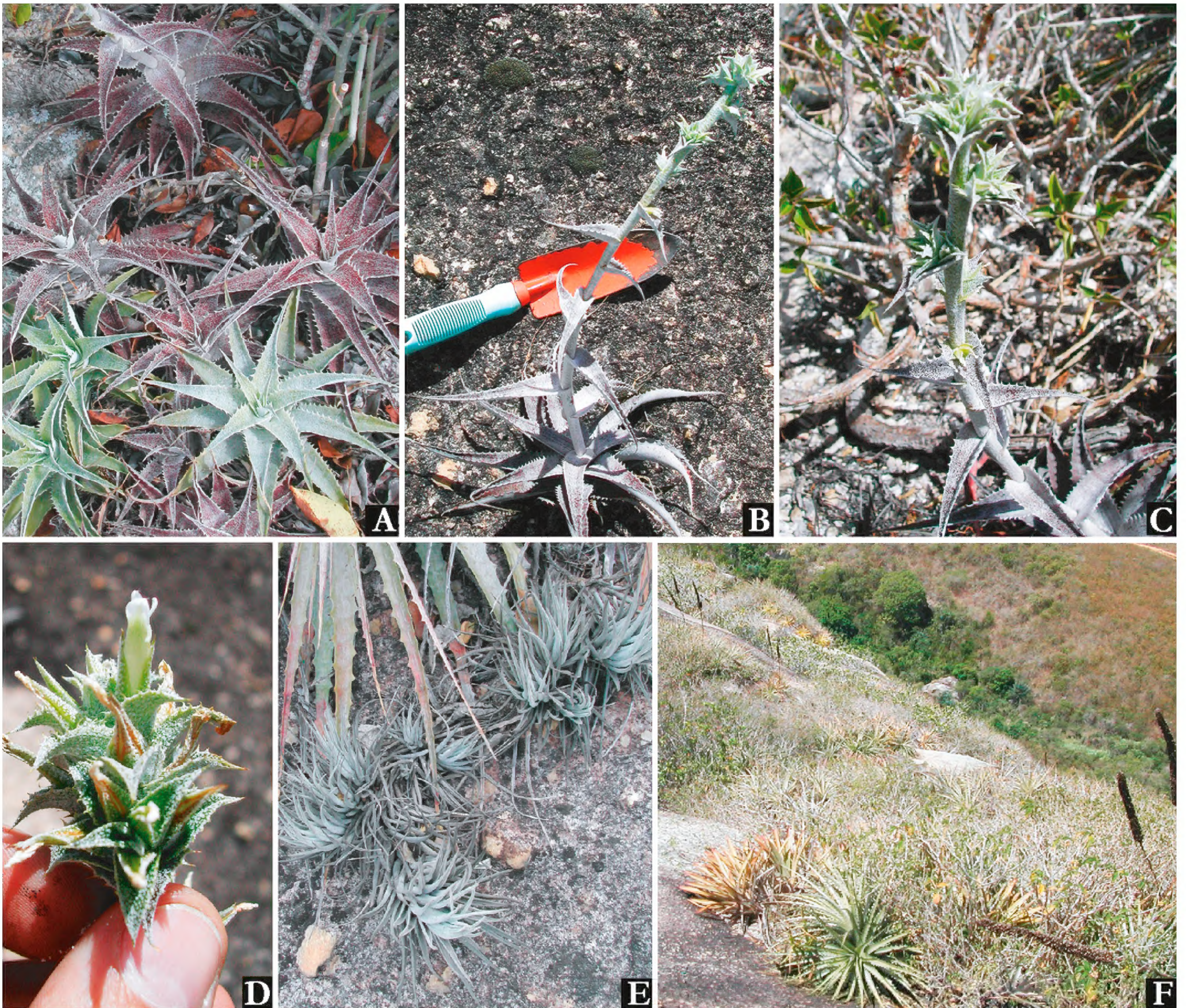


FIGURE 2. A-D) *Orthophytum disjunctum* collected on inselbergs, Serra de São Bento, RN, Brazil: A) Two color morphs growing side by side, one brownish-red and another pale green; B) Habit; C) Pedunculate inflorescence; and D) Close-up of flower. E) Sterile individuals of *Tillandsia paraibensis*. F) Overview of the rupicolous vegetation over the inselberg including mats of *Encholirium spectabile* Martius ex Schultes & Schultes filius

ACKNOWLEDGMENTS: We thank Dr. R.B. Louzada for confirming the identification of *Orthophytum* species and R. Smythe for carefully proof-reading the text, one anonymous reviewer, Dr. A.P.G. de Faria, and editor Dr. F. Guilherme for helpful comments on the manuscript. The second author had a REUNI/PIBIC/UFRN fellowship (project 6738-2011).

LITERATURE CITED

- Albuquerque, U.P., E. de Lima Araújo, A.C.A. El-Deir, A.L.A. de Lima, A. Souto, B.M. Bezerra, E.M.N. Ferraz, E.M.X. Freire, E.V.d.S.B. Sampaio, F.M.G. Las-Casas, G.J.B. de Moura, G.A. Pereira, J.G. de Melo, M.A. Ramos, M.J.N. Rodal, N. Schiel, R.M. de Lyra-Neves, R.R.N. Alves, S.M. de Azevedo-Júnior, W.R. Telino-Júnior and W. Severi. 2012. Caatinga revisited: ecology and conservation of an important seasonal dry forest. *The Scientific World Journal* 2012 (205182): 1-18.
- Benzing, D.H. 2000. *Bromeliaceae: profile of an adaptive radiation*. Cambridge: Cambridge University Press. 655 p.
- Forzza, R.C., J.F.A. Baumgratz, C. Bicudo, D. Canhos, A. Carvalho, A. Costa, D. Costa, M. Hopkins, P. Leitman, L. Lohmann, E. Lughadha, L. Maia, G. Martinelli, M. Menezes, M. Morim, M. Nadruz-Coelho, A. Peixoto, J. Pirani, J. Prado, L. Queiroz, V. Souza, J. Stehmann, L. Sylvestre, B. Walter and D. Zappi. 2010. Síntese da diversidade brasileira – Introdução; p. 21-42 *In* R.C. Forzza (ed.). *Catálogo de plantas e fungos do Brasil*. Rio de Janeiro: Andrea Jakobsson Estúdio.
- Forzza, R.C., A. Costa, J.A. Siqueira Filho, G. Martinelli, R.F. Monteiro, F. Santos-Silva, D.P. Saraiva and B. Paixão-Souza. 2012. Bromeliaceae *In Lista de Espécies da Flora do Brasil*. Version 2012. Electronic Database accessible at <http://floradobrasil.jbrj.gov.br/2012/FB006281>. Captured on 13 December 2012.
- Leal, I.R., M. Tabarelli and J.M.C. Silva. 2003. *Ecologia e conservação da Caatinga*. Recife: Editora Universitária da UFPE. 822 p.
- Louzada, R.B. and M.G.L. Wanderley. 2010. Revision of *Orthophytum* (Bromeliaceae): the species with sessile inflorescences. *Phytotaxa* 13: 1-26.
- Louzada, R.B. and M.G.L. Wanderley. 2011. A new species of *Orthophytum* (Bromeliaceae) from Chapada Diamantina, Bahia, Brazil. *Phytotaxa* 28: 27-30.
- Luther, H.E. 2010. *An Alphabetical List of Bromeliad Binomials*. Sarasota: Sarasota Bromeliad Society and Marie Selby Botanical Gardens. 45 p.
- Pontes, R.A.S. 2012. *Tillandsia paraibensis*, a new species of Bromeliaceae from Northeastern Brazil. *Rodriguésia* 63(3): 551-555.
- Siqueira-Filho, J.A. and E.M.C. Leme. 2006. *Fragmentos de Mata Atlântica do Nordeste: Biodiversidade, conservação e suas bromélias*. Rio de Janeiro: Andrea Jakobsson Estúdio. 360 p.
- Smith, L.B. and R.J. Downs. 1979. Bromelioideae (Bromeliaceae). *Flora Neotropica* 14(3): 1493-2142.
- Thiers, B. [continuously updated]. Index Herbariorum: A global directory of public herbaria and associated staff. Electronic Database accessible at <http://sweetgum.nybg.org/ih/>. Captured on 11 December 2012.
- Versieux, L.M. and E.M.C. Leme. 2007. A new lithophytic *Orthophytum* (Bromeliaceae) from the Espinhaço Range, Minas Gerais, Brazil. *Novon* 17(1): 130-134.

RECEIVED: January 2013

ACCEPTED: April 2013

PUBLISHED ONLINE: June 2013

EDITORIAL RESPONSIBILITY: Frederico Augusto Guimarães Guilherme